NOTES.

ACCORDING to the *Pioneer Mail*, the provision of a Pasteur Institute for Burma is now assured, but some little time must elapse before the work can be started. The local community has come forward liberally in subscribing nearly a lakh of rupees, and the Government of India is understood to be addressing the Burma Administration on the subject of ways and means for carrying the scheme into effect, the total cost of such an institution being, of course, much in excess of the sum that has been raised.

AT the sixth annual meeting of the Association of Economic Biologists, held at University College, London, on April 15, Mr. A. E. Shipley, F.R.S., was elected president for 1908. A summary of the scientific proceedings appears among our reports of societies. The following resolution was passed at the meeting:—"That this association, recognising the great need of an organised inquiry into the feeding habits of the birds of the British Isles with the view of obtaining a practical knowledge of their economic status, is of the opinion that a committee should be formed with the object of carrying on investigations on this subject."

ON Tuesday next, April 28, Mr. Gerald Stoney will begin a course of two lectures at the Royal Institution on "The Development of the Modern Turbine and its Application"; on Thursday, April 30, Mr. W. Bateson will commence a course of three lectures on "Mendelian Heredity" (these are the Tyndall lectures); and on Saturday, May 2, Mr. G. F. Scott Elliot will deliver the first of two lectures on "Chile and the Chilians." The Friday evening discourse on May 1 will be delivered by Prof. Joseph Larmor, on "The Scientific Work of Lord Kelvin"; on May 8 by Mr. J. Y. Buchanan, on "Ice and its Natural History"; and on May 15 by Mr. Herbert Timbrell Bulstrode, on "The Past and Future of Tuberculosis."

AT the London Institution on April 15, Mr. Valdemar Poulsen lectured on "Telephoning without Wires." The paper was translated and read to the audience, and showed that Mr. Poulsen has made a great advance in radiotelephony since his last lecture in London at the Queen's Hall two years ago. The progress made in wireless telephony is shown by the fact that conversation has been carried on across Denmark from Lyngby to another wireless telephone exchange at Esberg, 170 miles distant. The reproduction of the voice was clear and distinct, and easy to recognise. In addition to this, a further trial was made with a phonograph played in Berlin, the music of which was heard distinctly at Lyngby, near Copenhagen, 290 miles distant. At the close of the lecture some experiments with a phonograph were made, and the strains of two pieces of music were radiated to a telephone box in the roof of the building, whence the audience were enabled to hear the reproduction through telephone receivers. Mr. Poulsen showed an apparatus which was guaranteed to receive wireless messages in the Morse code, telephone cables, and wireless photographs. The wireless photographs are produced by the deflection of a recorder for the fraction of a second by wireless impulse. A ray of light shines on a photographic plate, and consequently a photographic negative of easily read signals is produced. Mr. Poulsen has also produced a practical transmitter of such a size that it can easily be carried in baggage, and thus enables an officer on sea or land to communicate with other units in his own voice.

MR. J. R. PENNELL, Mr. A. Kinnes, and Mr. H. C. Booth have been appointed to the vacant junior assistantships in the National Physical Laboratory.

SOME months ago we had occasion to notice a paper by Mr. G. R. Marriner on the habits of the New Zealand kea parrot. A volume by the same observer, entitled "The Kea: a New Zealand Problem," is now announced by Messrs. Marriner and Spencer, of Christchurch, N.Z.

WE have to acknowledge the receipt of two parts (vol. xi., part ii., and vol. xii., part i.) of the Transactions of the Leicester Literary and Philosophical Society. In the latter of these, special interest attaches to a paper by Mr. T. O. Bosworth on the origin and mode of deposit of the Upper Keuper beds of the county. In this paper, which was read at the Leicester meeting of the British Association, the author points out that the climate of the Carboniferous epoch, like that of the present day, had a highly disintegrating effect on the igneous rocks of Charnwood Forest. Where, however, the Charnwood rocks have been buried under Keuper deposits, they present a sharp, uneroded surface, indicating the existence of dry desert conditions at the date of deposition of the latter.

IN the February issue of the *Bulletin international* of the Academy of Sciences of Cracow, Mr. K. Stolyhwo describes a human skull dating from the historic period which presents strong indications of close affinity with the Spy-Neanderthal type, the so-called *Homo primigenius*, of the Palæolithic epoch. The skull, it appears, formed part of a skeleton from a tomb in which was also buried a suit of chain-armour, together with iron spear-heads, &c. In the great development of the supra-orbital ridges and of the notch at the root of the nasals, the skull, which was found at Nowosiolka, closely approximates to the Neanderthal type. It may be added that, in view of Prof. Sollas's recent reference of the latter to the Australian stock, the occurrence in eastern Europe of a late survival of the same type is a matter of profound interest.

THE Indian Forest Department has decided to issue two new serials, *Indian Forest Records* and *Indian Forest Memoirs*, for the publication of departmental literature. The first part of the *Records*, published in Calcutta in January, is devoted to an elaborate account, by Mr. E. P. Stebbing, entomologist to the department, of the lac-insect and its product. Although the exports of lac from India are of immense value, amounting in 1905–6 to more than three crores of rupees, a comparatively small revenue is yielded to the Forest Department from this source, and one of the objects of the inquiry was to ascertain whether matters could not be put on a more satisfactory footing in this respect. The inquiry also related to possible improvements in the methods of collecting the lac. The account is illustrated with two plates, one devoted to the life-history of the insect and the other to the mode of formation of the lac. It is unfortunate that, on its first page, the part bears the date of 1907 instead of 1908.

INSECTS injurious to the valuable sal-forests of Assam, together with the parasites and other insects by which they are infested or attacked, form the subject of an article by Mr. Stebbing, issued at Calcutta as *Forest Bulletin* No. 11. It has long been known that these forests are subject to severe damage from the attacks of leaf-eating caterpillars, but Mr. Stebbing considered it probable that the chief harm would be found due to a longicorn beetle akin to the one attacking sal-timber in central India. Unfortunately, this suggestion has proved only too true, great damage being caused to the Assam timber-supply by the species (*Hoplocerambyx spinicornis*) so harmful to the forests of Chutia Nagpur.

The report for the year 1906, prepared by Mr. J. H. Maiden, appertaining to the botanic gardens and Government domains in Sydney, has been received. A list of groups of plants specially interesting to students is provided, and the situations in which they may be found. The successful novelties introduced to the gardens include *Fagus sylvatica*, var. *heterophylla, Physostegia virginiana, Cassia occidentalis,* known as Negro Coffee, the indigenous species *Angophora cordifolia* and *Cheiranthera linearis,* and some West Australian shrubs.

Dr. C. Hosseus communicates to *Engler's Botanische Jahrbücher* (vol. xl., part iv.) an account of the vegetation observed on Doi Sutap, a mountain situated in the Shan States attached to Siam. Ascending from the rice fields, a light wood of teak and Albizzia, carpeted with composites and leguminous plants, was first reached. The "Hill Eng" forest, composed of species of Dipterocarpus and allied genera, on which numerous epiphytes grow, began at an elevation of 1000 feet. After ascending 2000 feet higher a forest of *Pinus khasyana* was found, giving place to bamboo vegetation at 4000 feet. In this zone the new genus of the order Rafflesiaceæ, *Richthofenia siamensis,* was discovered; several new species were also found near and between the summits.

It is usual to associate Montserrat with the production of limes, so that it occasions some surprise to read in the annual report for 1906–7 of the botanical establishments on that island that cotton promises to become the most important industry. In the space of four years there has been a significant increase in the amount and value of the cotton exported. At the same time, the distribution list of the botanic station furnishes evidence of a considerable demand for limes, in addition to which cacao and Castilloa rubber trees have been in request. An introduced industry, in the shape of onions grown from Teneriffe seed, shows a remarkable development within the year, and it is stated that further expansion is only prevented by the limited shipping facilities.

An article by Mr. A. Maumerné on Japanese dwarf trees, their forms and cultivation, is published in the Journal of the Royal Horticultural Society (vol. xxxii., part i.). There are definite æsthetic canons regulating the forms and outlines that are produced. Many of the artistic effects are due to training of the branches, others to special development of the roots. Conifers are the favourite plants for working on, especially species of Thuya and Pinus. Grafting is frequently practised with species of Podocarpus and maples. In the same volume will be found a useful article on horticultural law, by Mr. H. M. Veitch, in which he discusses such points as rights with regard to overhanging trees, fixtures, and trespassers. An annotated list of Gesneraceæ is contributed by Colonel H. Beddome.

Messrs. Constable and Co. have just commenced the publication of a new monthly magazine—*The Country Home*—the scope of which is sufficiently conveyed in the title. Descriptions of artistic and famous country houses are provided in the accounts of Stoke D'Abernon Manor House and of several black-and-white timbered houses in Cheshire and adjacent counties. There is a sprinkling of natural history in various articles. Mr. F. Moore contributes an excellent article on the making of lawns, and one may expect useful hints on intensive cultivation in the legend of the gardener and the cook, told by Miss L. Yates. Mr. J. W. Odell writes the monthly notes on the garden and greenhouse. In extending a welcome to this new venture, which is attractively got up and well printed, it may be hinted that, possibly for the sake of variety, several of the articles are too short to arouse much interest.

"A Catalogue of the Library of Charles Darwin now in the Botany School, Cambridge," has been compiled by Mr. H. W. Rutherford, of the University library, and published by the Cambridge University Press. Mr. Francis Darwin has contributed an introduction, in which he gives interesting information, supplementary to the account contained in the "Life and Letters," concerning his father's methods of work and treatment of books. The collection of books now bequeathed to the University is not identical with that at Down; thus, the books Darwin wrote and some few others from Down remain in the possession of Mr. Francis Darwin. Darwin's pamphlets are not included in the catalogue, though part of them are on the shelves alongside his books. The introduction points out that Darwin hardly ever had a book bound, and the collection retains to a great degree its original ragged appearance. The general characteristic of the library is incompleteness, hardly any set of periodicals being perfect. The chief interest of the Darwin books lies in the pencil notes scribbled on their pages, or written on scraps of paper and pinned to the last page. Books are also to be found marked with a cypher, as described in "Life and Letters." Mr. Francis Darwin provides many facts of interest in connection with some of the more important books included in the library. In a preface, Prof. Seward expresses to Mr. Darwin the high appreciation of the botany school and University for rendering the library available to all students. The price of the catalogue is 1*s*. net.

In the *Engineering Magazine* for April, Mr. Jacques Boyer gives an illustrated description of the rescue appliances used in the French collieries, special attention being given to the Tissot respirator, which dates from 1907, and the Vanginot respirator, which has been in service for several years in the Paris Fire Department, and is coming into increasing use in the French collieries.

Bulletin No. 250 of the Michigan State Agricultural College contains a full description, with plans and illustrations from photographs, of the new college farm buildings recently erected at a cost of 15,000 dollars, of which 10,000 dollars was granted by the Michigan State Legislature. The buildings are designed solely for ordinary farm purposes, and not for special experiments, and the bulletin is issued with the idea of furnishing farmers with plans of buildings considered suitable for the local requirements.

At the Institution of Mechanical Engineers on April 10, Prof. Bertram Hopkinson read a paper on the effect of mixture strength and scavenging upon thermal efficiency. The method used for measuring the gas, described in the author's previous paper on the mechanical efficiency of a forty brake horse-power Crossley gas-engine, was especially advantageous, for it gave the actual volume of gas used in the series of forty or fifty explosions from which the indicator diagrams were taken, and the materials for a complete measurement could thus be obtained in a few minutes. Diagrams with three or four different gas-consumptions could be got within an hour, during which time the calorific value of the gas would remain constant, so that the effect of changing the strength of mixture or of scavenging by running without load could be very accurately determined. When allowance is made for the gas discharged unburnt, the efficiency is not much affected by scavenging provided the strength of mixture is kept the same, which implies an increase of about 15 per cent. in the gas-charge, with, of course, a corresponding increase of mean pressure. At the same meeting Mr. James Atkinson read a paper on the governing and regularity of gas-engines, in which the various methods of governing employed were critically discussed.

THE report of the Observatory Committee of the Royal Cornwall Polytechnic Society for the year 1907 has been received. The Falmouth Observatory is one of the important meteorological establishments subsidised by the London Meteorological Committee for the tabulation of automatic records; it has a complete magnetic equipment, and during the year in question received material assistance from the Royal Society towards the maintenance of this branch of its useful work. The observations fairly represent the conditions in the west of England; the mean temperature of 1907 was 0°·4 below, and the rainfall 2·78 inches above, the mean. During a brilliant display of aurora, on February 9, the magnetographs showed that a storm of great intensity was in progress.

THE Stonyhurst College Observatory (Lancashire), which has likewise sent us a copy of the results for 1907, also receives some allowance from the Meteorological Office. Its records (together with those of the Liverpool Observatory) represent the meteorological conditions in the north-west district of England, and it possesses a valuable series of observations extending over sixty years. The rainfall of the year was 3 inches above, and the temperature 0°·6 below, the average. Magnetic observations are carefully recorded, but the staff is too limited to undertake hourly tabulations from the curves. Some 198 drawings of sun-spots and faculæ were made, and Father Sidgreaves remarks on an unexpected revival of solar activity and magnetic diturbance.

THE Royal Geographical Society has published a "Bibliography of Topographical and Geological Works on the Phlegræan Fields," by Mr. R. T. Günther, containing about 2200 titles of books, papers in scientific and other periodicals, maps, and drawings, relating to the city of Naples and the country to the west of it, together with the volcanic islands in the vicinity. The catalogue is specifically restricted to the geomorphology, topography, and physical features of the region, and is arranged as a subject catalogue, the entries being grouped in topographical sections or sections devoted to special subjects, and printed in each group consecutively in order of date of publication. When supplemented, as in this case, by an index of authors and subjects, no more convenient arrangement could be devised. The catalogue will be of great service to students of volcanic and kindred phenomena, and to others interested in the region dealt with, but the reference to geology in the title might well have been omitted, for the list is by no means complete in this department; we notice the inclusion of papers which have no real bearing on the subjects to which the bibliography is restricted, and the omission of others which should have been included.

THE March number of the *Psychological Review* contains the second of two interesting articles, by Dr. Boris Sidis, setting forth a new explanation of hallucinations. It is based upon a novel theory of perception, the exposition of which was contained in the former article. The perception of an object involves, as is well known, a reference to other sense qualities of the object than those immediately presented. Thus we may "see," not only the transparency, smoothness, and whiteness of a lump of ice, but also its coldness and weight. Former doctrines of perception have regarded the latter factors of the perceptual complex as images; in opposition to this view Dr. Sidis maintains that, like the former, they are sensational. He distinguishes them from the sensational elements the material causes of which actually affect the sense organs, by calling the latter "primary" and the former "secondary sensory elements." In normal perception we have a group containing elements of both types organised round a nucleus of primary elements, but under abnormal conditions it may happen that the primary sensory elements become subconscious or fall entirely out of the patient's consciousness, leaving a group of secondary sensory elements standing as an independent synthetised compound. Such a dissociated group of secondary sensory elements constitutes an hallucination.

DR M. MARAGE described before the Paris Academy of Sciences a method invented by him of photographing the vibrations of a thin india-rubber membrane when acted on by the tones of the human voice. A small mirror is attached to the membrane, and a beam of light is reflected from it upon a band of sensitised paper slowly moved by a small electromotor. After receiving the impression the photographic paper is drawn by the motor through two developing baths, and finally into a fixing bath. There is nothing strikingly novel in the method, and the examples of the tracings given in the paper published in the *Comptes rendus* of the academy do not seem to be clear or to give much information.

MR. J. W. GILTAY, of Delft, Holland, has sent us a descriptive catalogue of apparatus for demonstrating the action of light on selenium. The selenium cells listed are of the Shelford Bidwell type, their resistance in the dark ranging from 25,000 ohms to 500,000 ohms. Low resistance and high sensitiveness, it is noted, do not go together. These cells have been manufactured by Mr. Giltay ever since 1881, and among those to whom they have been supplied is Dr. Korn, who uses them in his well-known process of telegraphic photography. Their capabilities in this direction are demonstrated by a reproduction of an excellent portrait of Dr. Korn, which was transmitted electrically. Among other apparatus described is a miniature photophone. Words spoken into the mouth-piece of the transmitter act upon an acetylene manometric flame, which illuminates a selenium cell placed near it; the cell is connected in circuit with a battery and a telephone receiver in a distant room, and the speaker's voice is heard at the telephone. Several modifications of this apparatus are described. A compact battery of forty-nine cells, providing the high electromotive force requisite for experiments with selenium, is supplied at a moderate price.

Le Radium for March contains an account of the work done recently by M. A. Dufour on the effect of pressure on the wave-lengths of the absorption lines of nitrogen peroxide and bromine. The observations made hitherto on the effect of pressure on emission spectra have led to the conclusion that the lines of bands were unaffected. M. Dufour finds, on the contrary, that certain lines of the absorption spectra of the two vapours mentioned are influenced by pressures up to about 20 atmospheres. The whole of the lines of the absorption bands are broadened and rendered less sharp, but certain lines are unaltered in wave-length, while others increase by amounts of the order of a few hundredths of an Ångström unit per atmosphere increase of pressure. There seems to be no connection between the influence of pressure on the wave-length and the Zeeman effect in the case of bromine, although there may possibly be such a connection in the case of nitrogen peroxide.

SOLUTIONS of the examples in "A Sequel to Elementary Geometry," by Mr. J. W. Russell, which was reviewed in the issue of NATURE for February 6 last (vol. lxxvii., p. 315), have been prepared by the author, and published at the Clarendon Press, Oxford. The price of this key is 3*s.* 6*d.* net.

OUR ASTRONOMICAL COLUMN.

STRUCTURE OF THE CORONA.—In No. 19, vol. ii., of the *Mitteilungen der Nikolai-Hauptsternwarte zu Pulkowo*, Prof. Hansky discusses the results derived from a study of the photographs of the corona taken by the Pulkowa expedition at Alcocèbre (Spain) during the total solar eclipse of August, 1905. The principal aim of the photographs was to determine the velocity of the propagation of coronal matter in space, and the eight exposures were therefore arranged symmetrically about mid-eclipse, and given approximately equal times.

Each streamer and prominence shown on the photographs is discussed very fully, and Prof. Hansky finally draws the following conclusions. The corona of 1905 was of the "maximum" type, and was divided into eight groups of streamers, arranged symmetrically about the sun's axis. It appears probable that the forms and directions of the coronal streamers depend upon the forms and directions of the prominences above which they are found. In this conclusion Prof. Hansky's result agrees with that recently published by Dr. W. J. S. Lockyer (see NATURE, No. 2005, p. 514). The centres of emission of the streamers, though often near spots, do not coincide with them. Those streamers which occur over great prominences are readily distinguishable by their forms. The jets of prominences resemble jets of matter, the observed velocity of which approximates to 200 km. per sec. Any movement of coronal clouds above prominences is shown to be very slow, its velocity not exceeding 30 km. per sec.; this is so small that any such movement during the three minutes of totality would not produce a change of position sufficiently great to exceed the limits of observational errors.

SPECTROSCOPIC BINARIES NOW UNDER OBSERVATION.—With the view of assisting in the prevention of unnecessary duplication in the observation of spectroscopic binaries, Prof. Frost, director of the Yerkes Observatory, recently addressed a circular letter to the principal observers in this work asking them to furnish him, for publication in the *Astrophysical Journal*, with a list of the objects now under observation at the several institutions. The various replies appear in No. 2, vol. xxvii., of the journal (p. 161), and show that duplicate observations are already in progress. Prof. Hartmann points out, whilst furnishing a list of stars, that duplication is not necessarily an evil, for, with the determination of radial velocities still in a state of evolution, such duplication serves as an independent check on the various results. Prof. Pickering suggests several pieces of work where cooperation would probably lead to useful results, and points out that, even with an objective-prism spectrograph, the star ζ Ursæ Majoris shows marked irregularities in its spectrum which have not yet been accounted for.

THE RELATION BETWEEN THE COLOURS AND PERIODS OF VARIABLE STARS.—In an interesting paper which appears in No. 4238 of the *Astronomische Nachrichten* (p. 209, March 9), Herr S. Beljawsky, Göttingen, discusses at some length the relation found to exist between the colours and the periods of variable stars. From the tables and curves given in the paper it is seen that in general the variable stars of long period are much redder than the short-period variables. Regarding the amplitudes of the typical light-curves, it is found that up to periods of 200 days the amplitude increases with the period, beyond 200 days it appears to remain constant.

A FIELD METHOD OF DETERMINING LONGITUDES.—Paper No. 5 of the Egyptian Survey Department is devoted to an explanation, by Mr. E. B. H. Wade, of an instrument designed by him for making field determinations of longitude by observations of the moon. By a system of mirrors placed at the object-glass end of a small 2½-inch telescope, Mr. Wade successively brings the images of two stars in contact, tangentially, with the limb of the moon, thus finding the times of equal lunar distance. The apparatus is ingeniously designed, and is readily portable. Full explanations of the instrument and the method are given in the paper, which is illustrated by a number of diagrams and curves.

OBSERVATIONS OF EROS.—The results of ten measures of the position of Eros, made with the 15-inch refractor of the Uccle Observatory during the period September 25 to October 19, 1907, are published in No. 4240 of the *Astronomische Nachrichten* (p. 252, March 23) by Herr G. Van Biesbroeck. Comparing the positions thus determined with those given in the ephemeris published in the "Berliner Jahrbuch" for 1909, it is seen that the mean corrections to the latter are −1·10s. in R.A. and −8″·0 in declination.

VARIABLE RADIAL VELOCITY OF η VIRGINIS.—A note in No. 2, vol. xxvii., of the *Astrophysical Journal* (p. 160, March) gives the provisional elements of the orbit of the brighter component of η Virginis, as determined at the Ottawa Observatory by Mr. W. E. Harper. The period is found to be 71·9 days, the velocity of the system +2·2 km. per sec., the eccentricity of the orbit 0·4, and the length of the semi-major axis 25,750,000 km. The velocity-curve shows a variation from −40 km. to +20 km.

AGRICULTURAL EXPERIMENTS AND REPORTS.

THE eighth report of the Woburn Experimental Fruit Farm contains a very valuable investigation of the washes commonly used for spraying fruit trees. They have hitherto been made up in rather a haphazard way, without much reference to the chemical changes involved, and Mr. Pickering is to be congratulated on having reduced them to a scientific basis. He shows that Bordeaux mixture (obtained by precipitating copper sulphate solution with lime) made in the ordinary way consists of

$$10CuO,SO_3,4CaO,SO_3,$$

but this is not so economical as another precipitate, $4CuO,SO_3$, for obtaining which full instructions are given. An investigation of the "Woburn wash" (paraffin emulsion and caustic soda) led to a very important examination of emulsions in general, which has enabled Mr. Pickering to state the conditions under which they may be expected to form. When oil is churned with water it is broken up into very minute particles; if still smaller particles of an insoluble substance are present, they coat the oil drops and prevent them from coalescing; an emulsion is therefore formed. During the progress of this work Mr. Pickering discovered a new emulsion which promises to be of great service to the fruit-grower. Basic copper sulphate (obtained by adding lime to ordinary copper sulphate) was churned with oil and water, and gave a perfect emulsion to which caustic soda could be added without any adverse effect. The result is a wash containing the three things which have to be used in winter and spring; the grower can therefore get them all on in one operation instead of in three as hitherto. The insecticidal and fungicidal action of these and other washes was also investigated, and there is a discussion of the nature of the action of insecticides.

Of late years molasses has been increasingly used as cattle food, and various agricultural stations have investigated its digestibility and nutritive value. A Bulletin